

## **"DISPOSITION INTRODUCED IN SPORTS BALL".**

The present invention refers to sport balls, such as those for use in soccer, basketball, volleyball and others, which may be sewn, vulcanized or processed by matrix, featuring an external pattern applied to its entire outer surface, being said pattern made up of a plurality of equally spaced apart cavities with identical dimensions, with the purpose of improving the aerodynamic characteristics of the ball along its trajectory, with no deviation, imparting great precision to it's movement.

### **Description of the Related Art**

The current state of the art includes several spot balls featuring protrusions or cavities over its surface, specially those that require improved performance regarding grip precision upon handling by the sport player, such as basketballs, footballs, baseballs and others.

Basketballs, for instance, usually feature several protrusions or crests spread over its outer surface, which purpose is to enhance friction between the ball and the player's hand. Other basketballs feature cavities or recesses in their outer surface, with the purpose of improving the grip of spherical balls and consequently enhance precision upon the launching of said balls.

U.S. Patent 6,261,197, by Grechko, discloses a ball with a plurality of cavities positioned over part of its outer surface, with the purpose of allowing its curved launching. One example of such application is a baseball.

The main purposes of the cavities applied on the balls disclosed by said patents is to enhance the ball's friction and grip upon contact with the player's hands (firmness), such as

for example in basketballs, or allow their launching into a curved trajectory, such as for example in baseballs. Therefore, the above indicated patents aim for solutions which enhance precision in the contact between the ball and the player's hands, and also changing the ball's trajectory, such as in baseball. None of these patents presents a convenient solution for one of the drawbacks of the present state of the art regarding the precision and stability of the ball's trajectory, for instance when there are external interference with its movement, such as wind action, among others.

Other patterns applicable to sport balls which are largely widespread regard those used in golf balls. Golf balls employ several cavity configurations applied over the ball's outer surface, for the purpose of enhancing it's range when compared to that of a smooth surface ball, or even offer more or less control to the athlete during the launching. Therefore several cavities are usually employed, practically tangent to each other and positioned in groups of cavities inserted in imaginary, polygonal areas over the ball's surface.

The main purpose of said configurations is to reduce the ball's drag along its trajectory, which makes possible, for instance, a longer range of shooting. However, larger dimension balls, such as for example inflatable soccer balls, basketballs, volleyballs, among others, present a much less stable behavior along its path in the air, even because said balls feature a much lower density if compared to solid balls such as golf balls. Thus, one of the main problems presently encountered regards the possible deviations in trajectory which occur by action of external elements, such as wind action or even the ball's imprecision and flotability, thwarting a straight

trajectory, being that shooting range not the main characteristic to be improved upon.

Therefore, the main performance characteristics in inflatable sport balls such as it's stability, trajectory precision and lower flotability with the smallest possible deviation have not yet been significantly improved.

#### **Objects of the Invention**

The main object of the present invention is to provide a sports ball, with high performance and quality, featuring cavities all over its outer surface, which improve the ball's aerodynamic characteristics along it's trajectory, with no deviations due to wind action, reducing the air friction over the ball, leading to great precision in its movement, with higher stability and less flotability.

#### **Brief Description of the Drawings**

The present invention will be described in more detail based on an execution example which is depicted in the Figures, in which:

Figure 1 is a front view of a sports ball, for instance a soccer ball, provided with cavities uniformly distributed along its outer surface, example of execution of the present invention;

Figure 2 is a detail of a partial cross section, based on the detail A of Figure 1, illustrating the cavities of the present invention;

Figure 3 is a front view of another sports ball with the cavities on its surface, another execution example of the present invention.

## **Detailed Description of the Invention and the Annexed Figures**

Making now reference to the annexed Figures, on Figures 1 and 3 are execution examples of the present invention, where the sports ball is provided with an inflatable body (hollow), with a convex outer surface (1), usually made of synthetic material, rubber or leather and which can be formed respectively by means of sewing, vulcanization or else processing by matrix.

Over said outer surface (1) are provided cavities or depressions (2), equally spaced apart, of identical dimensions and uniformly distributed along the convex outer surface (1) of said ball.

The region adjacent to said cavities (2) comprises protruding areas (3), of smooth, convex surface and which, along with said cavities or depressions (2) define an outer surface (1) of the sports ball. Said protruding areas (3) are more clearly visualized in Figure 2.

The spacing (e) existing between two adjacent cavities (2) defines the existence of said protruding areas (3), being said spacing (e) not substantially smaller than the external opening (d) of the cavities (2) itself, being also possibly bigger than the external opening (d) of said cavities (2). Therefore it is possible to obtain a pattern over its outer surface (1) with a higher or lower number of cavities (2) per area unit. Said more or less spaced-apart configurations may vary according to the kind of sport for which the ball is designed, resulting in an aerodynamic performance which is optimized for each application.

The pattern defined by the set of cavities (2) results from the alignment between lines of cavities positioned parallel to each other or from the staggering of lines which are parallel and interspersed with each other.

The opening (d) of the cavities (2) varies according to the kind of sports ball, as well as the quantity of cavities (2) per area unit, as well as the disposition of said cavities over the ball's surface (1). This way, a soccer ball may feature a distribution of cavities over its surface, whereas a basketball or volleyball may feature another one, which affords a better performance for each kind of sport.

On practical tests performed with conventional sport balls with smooth outer surface and balls provided with cavities according to the present invention, the aerodynamic response of the ball with cavities proved to be way better, regarding the steadiness of trajectory during its flight path and regarding the launching precision, based on a longitudinal axis starting on the ball's launching point.

Thus, on tests where the same energy was applied to a conventional, smooth ball and to a ball with cavities according to the present invention, the latter suffers much less interference of external actions along its trajectory, being said trajectory much more straight and with a much smaller deviation from the longitudinal launching axis if compared to a conventional ball.

Similarly, with launchings to higher altitudes, it was observed also that, applying the same energy, the ball provided with cavities along its outer surface reaches a higher altitude when compared to a conventional, smooth surface ball.

That is due to the fact that the drag of the ball with cavities is reduced, as well as the resistance of the air over said ball, resulting in better performance.

Therefore, said functional improvement may be applied to any kind of sport balls with a hollow, spherical body, such as those for practicing soccer, basketball, volleyball, handball, court or society soccer, among other sports.